

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
30 August 2001 (30.08.2001)

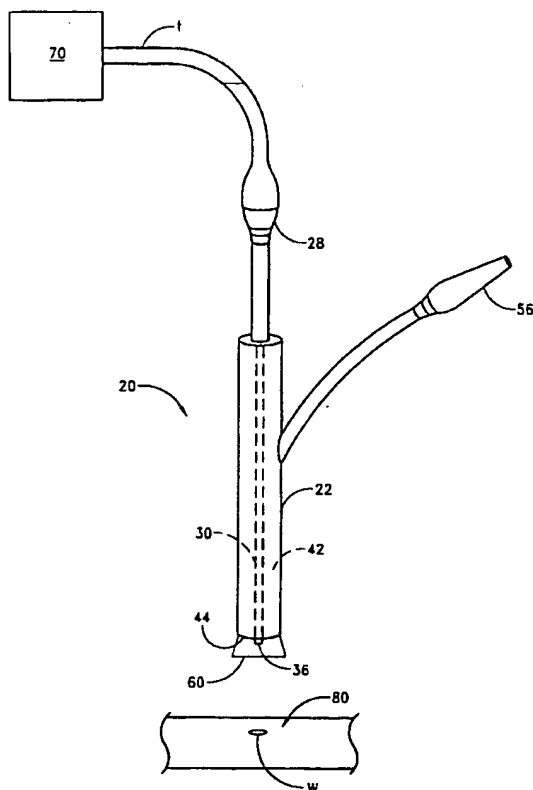
PCT

(10) International Publication Number
WO 01/62159 A3

- (51) International Patent Classification⁷: **A61B 17/00**
- (21) International Application Number: **PCT/US01/06149**
- (22) International Filing Date: 26 February 2001 (26.02.2001)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:
60/184,627 24 February 2000 (24.02.2000) US
- (71) Applicant: **LOMA LINDA UNIVERSITY MEDICAL CENTER [US/US];** 11234 Anderson Street, Loma Linda, CA 92354 (US).
- (72) Inventors: **ZHU, Yong, Hua;** 30919 Sutherland Drive, Redlands, CA 92373 (US). **KIRSCH, Wolff, M.;** 1360 Prospect Drive, Redlands, CA 92373 (US).
- (74) Agent: **DELANEY, Karoline, A.;** Knobbe, Martens, Olson & Bear, LLP, 16th Floor, 620 Newport Center Drive, Newport Beach, CA 92660 (US).
- (81) Designated States (*national*): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CR, CU, CZ, CZ (utility model), DE, DE (utility model), DK, DK (utility model), DM, DZ, EE, EE (utility model), ES, FI, FI (utility model), GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SK (utility model), SL, TJ, TM, TR, TT, TZ, UA, UG, UZ, VN, YU, ZA, ZW.
- (84) Designated States (*regional*): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).

[Continued on next page]

(54) Title: **PATCH AND GLUE DELIVERY SYSTEM FOR CLOSING TISSUE OPENINGS DURING SURGERY**



(57) Abstract: A patch applicator has an elongate body with an inner lumen and an outer lumen arranged concentrically. First and second connectors are provided and correspond to the inner and outer lumens, respectively. A patch is also provided. In operation, a source of vacuum is connected to the first connector and draws a vacuum through the inner lumen. The inner lumen is then applied to a patch to releasably hold the patch. The patch is advanced within the patient until it is placed on top of and over a wound in tissue. The source of vacuum is then transferred to the second connector and pulls a vacuum through the outer lumen to clear bodily fluid from a field around the wound. After the field is cleared, the source of vacuum is removed and replaced by a source of flowable adhesive. Adhesive is injected through the outer lumen onto the patch and tissue surrounding the patch. The patch applicator holds the patch in place, allowing the adhesive to set. A release rod is advanced through the first connector and through the inner lumen into contact with the patch. The applicator is then removed from the patch, followed by the release rod. Thus, an adhesive patch is attached to close an opening in tissue.



Published:

— *with international search report*

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(88) Date of publication of the international search report:

18 April 2002

INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 01/06149

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 A61B17/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 A61B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5 843 124 A (HAMMERSLAG JULIUS G) 1 December 1998 (1998-12-01) the whole document ---	1-16
X	WO 00 02488 A (BARAK SHLOMO) 20 January 2000 (2000-01-20) abstract; figures 4-10 ---	1-16
X	EP 0 745 350 A (SASAKI HIROSHI) 4 December 1996 (1996-12-04) the whole document ---	1-16
A	US 5 236 455 A (WILK PETER J ET AL) 17 August 1993 (1993-08-17) abstract; figures 1,4 --- -/--	1-16

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

* Special categories of cited documents:

A document defining the general state of the art which is not considered to be of particular relevance

E earlier document but published on or after the international filing date

L document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

O document referring to an oral disclosure, use, exhibition or other means

P document published prior to the international filing date but later than the priority date claimed

T later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

X document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

Y document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

Z document member of the same patent family

Date of the actual completion of the international search

27 September 2001

Date of mailing of the international search report

05/10/2001

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3016

Authorized officer

Hansen, S

INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 01/06149

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 99 62405 A (UNIV LOMA LINDA MED) 9 December 1999 (1999-12-09) abstract; figure 30 -----	1-16

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US 01/06149

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 5843124	A	01-12-1998	US 5653730 A	05-08-1997
			AU 4065897 A	06-03-1998
			EP 1011456 A2	28-06-2000
			JP 2001506510 T	22-05-2001
			WO 9807372 A2	26-02-1998
			US 6287323 B1	11-09-2001
			US 5665107 A	09-09-1997
			AU 7921494 A	18-04-1995
			WO 9508951 A1	06-04-1995
			US 5383899 A	24-01-1995
			US 5529577 A	25-06-1996
			US 5665106 A	09-09-1997
			US 5759194 A	02-06-1998
WO 0002488	A	20-01-2000	US 6048358 A	11-04-2000
			AU 4645999 A	01-02-2000
			EP 1096884 A1	09-05-2001
			WO 0002488 A1	20-01-2000
EP 0745350	A	04-12-1996	JP 8317927 A	03-12-1996
			CN 1136965 A	04-12-1996
			EP 0745350 A1	04-12-1996
			KR 172643 B1	20-03-1999
			US 5853399 A	29-12-1998
			US 5882331 A	16-03-1999
US 5236455	A	17-08-1993	NONE	
WO 9962405	A	09-12-1999	AU 4546599 A	20-12-1999
			EP 1083827 A1	21-03-2001
			WO 9962405 A1	09-12-1999
			US 6287322 B1	11-09-2001